Claims

1. Anhydrous lactitol crystals belonging to the orthorhombic $P2_12_12_1$ crystal system and having unit cell constants about a = 9.6 Å, b = 11.1 Å, c = 14.0 Å.

2. Anhydrous lactitol crystals according to claim 1, characterized in having unit cell constants about a = 9.622 Å, b = 11.132 Å, c = 14.022 Å.

sub B1) 3. Anhydrous lactitol crystals according to claim 1, characterized in having a melting point of 148-152°C, preferably 151-152°C, a water content below 0.5% and a lactitol content of more than 99%.

4. Anhydrous lactitol crystals according to claim 1, characterized in having a low lactulitol content, preferably below 0.5% and most preferably below 0.1% on the dry substance.

5. Anhydrous lactitol crystals according to claim 1, characterized in having a melting enthalpy of 165-170 J/g.

6. A crystalline anhydrous lactitol product characterized in that it contains anhydrous lactitol crystals belonging to the orthorhombic $P2_12_12_1$ crystal system and having unit cell constants about a = 9.6 Å, b = 11.1 Å, c = 14.0 Å.

7. A product according to claim 6, characterized in that it contains a mixture of said orthorhombic anhydrous lactitol and monoclinic anhydrous lactitol.

8. A product according to claim 6, characterized in that it contains a major portion of said orthorhombic anhydrous lactitol.

9. A product according to claim 8, characterized in that it consists essentially of said orthorhombic anhydrous lactitol.

sub B2) 10. A process for preparing anhydrous lactitol crystals belonging to the orthorhombic $P2_12_12_1$ crystal system and having unit cell constants about a = 9.6 Å, b = 11.1 Å, c = 14.0 Å, by crystallizing from an aqueous solution which contains not less than 70%, of lactitol on dry matter, characterized by bringing said aqueous lactitol solution to supersaturation in regard to lactitol, and subjecting the solution to crystallization

conditions at a temperature between about 70 and 150°C by boiling and/or cooling crystallization, allowing said solution to crystallize until a substantial first crystal yield is obtained, and conditioning said first crystal yield at a temperature of 70-100°C for a sufficient time to allow said first crystal yield to convert into a second crystal yield comprising orthorhombic anhydrous lactitol crystals, recovering orthorhombic anhydrous lactitol crystals from the mother liquor, and optionally washing and drying said crystals.

11. A process according to claim 10, characterized in that said crystallization is performed with spontaneous nucleation or with seeding with seeds of crystalline lactitol, such as monoclinic anhydrous lactitol, and that said first crystal yield comprises monoclinic anhydrous lactitol.

12. A process according to claim 10 or 11, characterized in that said crystallization is performed by cooling said lactitol solution from a starting temperature of about 100-80°C to an end temperature of about 70-80°C and conditioning said first crystal yield at said end temperature.

13. A process according to claim 10, 11 or 12, characterized in recovering a mixture containing orthorhombic anhydrous lactitol and monoclinic anhydrous lactitol.

14. A process for preparing anhydrous lactitol crystals belonging to the orthorhombic $P2_12_12_1$ crystal system and having unit cell constants about a = 9.6 Å, b = 11.1 Å, c = 14.0 Å, by crystallizing from an aqueous solution which contains not less than 70% of lactitol on dry matter, characterized by bringing said aqueous lactitol solution to supersaturation in regard to lactitol, and subjecting said solution to crystallization conditions at a temperature between about 70 and 150°C by boiling and/or cooling crystallization, seeding said supersaturated solution with seed crystals of orthorhombic anhydrous lactitol and separating the resulting orthorhombic anhydrous lactitol crystals from the mother liquor, and optionally washing and drying.

15. A process according to claim 14, characterized by evaporating an aqueous solution of lactitol to a concentration of 80-95% by weight and seeding the supersaturated solution at a temperature within the range 120-80°C, preferably 90-80°C, optionally evaporating further while adding lactitol solution within said temperature range to increase the crystal content, and preferably cooling the resultant mixture to an end temperature ranging from 70-100°C, preferably 70-80°C, separating the orthorhombic anhydrous lactitol crystals from the mother liquor, and washing and drying said crystals.

16. A process according to claim 14 or 15, wherein said seed crystals are provided in a crystal foot of orthorhombic anhydrous lactitol.

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17. A process for preparing anhydrous lactitol crystals belonging to the orthorhombic $P2_12_12_1$ crystal system and having unit cell constants about a = 9.6 Å, b = 11.1 Å, c = 14.0 Å, by crystallizing from an aqueous solution which contains not less than 70% of lactitol on dry matter, characterized by bringing said aqueous lactitol solution to supersaturation in regard to lactitol, and subjecting said solution to slow crystallization conditions at a temperature between about 150 and 70°C by slow boiling and/or cooling crystallization, recovering the resulting orthorhombic anhydrous lactitol crystals from the mother liquor, and optionally washing and drying said crystals.

18. A process according to claim 17, characterized by evaporating an aqueous solution of lactitol to a concentration of 85-95% by weight and seeding the supersaturated solution by adding seed crystals of monoclinic and/or orthorhombic anhydrous lactitol in a temperature range 80-100°C, and cooling the mixture slowly to an end temperature ranging from 70°C to 90°C, and recovering the resulting orthorhombic anhydrous lactitol crystals from the mother liquor.

19. A process according to claim 18, characterized by additionally conditioning the crystal yield at said end temperature prior to recovering said crystals.

claim 10 or 14 or 17

20. A process according to any one of the preceding ~~claims 10 to 19,~~ characterized in that the crystallization of orthorhombic anhydrous lactitol is improved by one or more measures selected from the addition of accelerating impurities such as lactulitol to the aqueous solution of lactitol, the increase of the supersaturation of said solution, the prolonging of the crystallization and/or conditioning time, and the addition of seed crystals of orthorhombic anhydrous lactitol (ß) to said solution.

21. A milled lactitol product made by milling crystalline anhydrous lactitol comprising crystals belonging to the orthorhombic $P2_12_12_1$ crystal system and having unit cell constants about a = 9.6 Å, b = 11.1 Å, c = 14.0 Å, characterized in that it has a mean particle size between 5 and 200 μm.

22. A milled lactitol product according to claim 21, characterized in that it has been obtained from anhydrous lactitol comprising orthorhombic anhydrous lactitol having

a melting point of 148-152°C and a lactitol content of more than 99% and a melting enthalpy of 165-170 J/g and that it has a melting point of 145-149°C and a melting enthalpy of 160-165 J/g.

23. Use of anhydrous lactitol crystals according to claim 1, 6 or 21 as a sweetener alone or in combination with other sweeteners.

24. Use of anhydrous lactitol crystals according to claim 1, 6 or 21 in sweets, jams, bakery products, chocolate, juices, cream fillings and ice-creams, or in pharmaceutical and hygienic products, such as toothpaste.

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